SEQUENCE LISTING

<110> Minerva Biotechnologies Corporation

<120> Techniques and Compositions for the Diagnosis and Treatment of Cancer (MUC1)

<130> M1015.70089WO00

<140> not yet assigned
<141> 2004-08-26

<150> US 60/498,260
<151> 2003-08-26

<160> 66

<170> PatentIn version 3.3

<210> 1
<211> 39
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Peptide

<400> 1

Gly Thr Ile Asn Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys
1 5 10 15

Thr Glu Ala Ala Ser Pro Tyr Asn Leu Thr Ile Ser Asp Val Ser Val
20 25 30

Ser His His His His His His
35

<210> 2
<211> 51
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<213> Artificial Sequence

<220>

<223> Synthetic Peptide

<400> 2

Gly Thr Ile Asn Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys
1 5 10 15

Thr Glu Ala Ala Ser Pro Tyr Asn Leu Thr Ile Ser Asp Val Ser Val
20 25 30

Ser Asp Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala His His His
35 40 45

His His His
50

<210> 3
<211> 54
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Peptide

<400> 3

Val Gln Leu Thr Leu Ala Phe Arg Glu Gly Thr Ile Asn Val His Asp
1 5 10 15

Val Glu Thr Gln Phe Asn Gln Tyr Lys Thr Glu Ala Ala Ser Pro Tyr
20 25 30

Asn Leu Thr Ile Ser Asp Val Ser Val Ser Asp Val Pro Phe Pro Phe
35 40 45

His His His His His His
50

<210> 4
<211> 31
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Peptide

<400> 4

His His His His His His Gly Phe Leu Gly Leu Ser Asn Ile Lys Phe
1 5 10 15

Arg Pro Gly Ser Val Val Val Gln Leu Thr Leu Ala Phe Arg Glu
20 25 30

<210> 5
<211> 46
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Peptide

<400> 5

Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly
1 5 10 15

Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro
20 25 30

Pro Ala His Gly Val Thr Ser Ala His His His His His His
35 40 45

<210> 6
<211> 33
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Peptide

<400> 6

Gly Thr Ile Asn Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys
1 5 10 15

Thr Glu Ala Ala Ser Pro Tyr Asn Leu Thr Ile Ser Asp Val Ser Val
20 25 30

Ser

<210> 7
<211> 45
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Peptide

<400> 7

Gly Thr Ile Asn Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys
1 5 10 15

Thr Glu Ala Ala Ser Pro Tyr Asn Leu Thr Ile Ser Asp Val Ser Val
20 25 30

Ser Asp Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala
35 40 45

<210> 8
<211> 25
<212> PRT
<213> Homo sapiens

<400> 8

Gly Phe Leu Gly Leu Ser Asn Ile Lys Phe Arg Pro Gly Ser Val Val
1 5 10 15

Val Gln Leu Thr Leu Ala Phe Arg Glu
20 25

<210> 9
<211> 40
<212> PRT
<213> Homo sapiens

<400> 9

Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly
1 5 10 15

Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro
20 25 30

Pro Ala His Gly Val Thr Ser Ala
35 40

<210> 10
<211> 1255
<212> PRT
<213> Homo sapiens

<400> 10

Met Thr Pro Gly Thr Gln Ser Pro Phe Phe Leu Leu Leu Leu Leu Thr
1 5 10 15

Val Leu Thr Val Val Thr Gly Ser Gly His Ala Ser Ser Thr Pro Gly
20 25 30

Gly Glu Lys Glu Thr Ser Ala Thr Gln Arg Ser Ser Val Pro Ser Ser
35 40 45

Thr Glu Lys Asn Ala Val Ser Met Thr Ser Ser Val Leu Ser Ser His
50 55 60

Ser Pro Gly Ser Gly Ser Ser Thr Thr Gln Gly Gln Asp Val Thr Leu
65 70 75 80

Ala Pro Ala Thr Glu Pro Ala Ser Gly Ser Ala Ala Thr Trp Gly Gln
85 90 95

Asp Val Thr Ser Val Pro Val Thr Arg Pro Ala Leu Gly Ser Thr Thr
100 105 110

Pro Pro Ala His Asp Val Thr Ser Ala Pro Asp Asn Lys Pro Ala Pro
115 120 125

Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
130 135 140

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
145 150 155 160

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
165 170 175

Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
180 185 190

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Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
        195                 200                 205

Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
    210                 215                 220

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
225                 230                 235                 240

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
                245                 250                 255

Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
            260                 265                 270

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
        275                 280                 285

Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
    290                 295                 300

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
305                 310                 315                 320

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
                325                 330                 335

Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
            340                 345                 350

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
        355                 360                 365

Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
    370                 375                 380

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
385                 390                 395                 400

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
                405                 410                 415

Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
            420                 425                 430

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
        435                 440                 445

Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
    450                 455                 460

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
465                 470                 475                 480

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
                485                 490                 495

Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
            500                 505                 510
```

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
515 520 525

Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
530 535 540

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
545 550 555 560

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
565 570 575

Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
580 585 590

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
595 600 605

Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
610 615 620

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
625 630 635 640

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
645 650 655

Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
660 665 670

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
675 680 685

Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
690 695 700

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
705 710 715 720

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
725 730 735

Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
740 745 750

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
755 760 765

Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
770 775 780

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
785 790 795 800

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
805 810 815

Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
820 825 830

```
Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
        835                 840                 845

Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
    850                 855                 860

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
865                 870                 875                 880

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
                885                 890                 895

Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
            900                 905                 910

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
        915                 920                 925

Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Asn
    930                 935                 940

Arg Pro Ala Leu Gly Ser Thr Ala Pro Pro Val His Asn Val Thr Ser
945                 950                 955                 960

Ala Ser Gly Ser Ala Ser Gly Ser Ala Ser Thr Leu Val His Asn Gly
                965                 970                 975

Thr Ser Ala Arg Ala Thr Thr Thr Pro Ala Ser Lys Ser Thr Pro Phe
            980                 985                 990

Ser Ile Pro Ser His His Ser Asp  Thr Pro Thr Thr Leu  Ala Ser His
        995                 1000                1005

Ser Thr  Lys Thr Asp Ala Ser  Ser Thr His His Ser  Ser Val Pro
    1010                1015                1020

Pro Leu  Thr Ser Ser Asn His  Ser Thr Ser Pro Gln  Leu Ser Thr
    1025                1030                1035

Gly Val  Ser Phe Phe Phe Leu  Ser Phe His Ile Ser  Asn Leu Gln
    1040                1045                1050

Phe Asn  Ser Ser Leu Glu Asp  Pro Ser Thr Asp Tyr  Tyr Gln Glu
    1055                1060                1065

Leu Gln  Arg Asp Ile Ser Glu  Met Phe Leu Gln Ile  Tyr Lys Gln
    1070                1075                1080

Gly Gly  Phe Leu Gly Leu Ser  Asn Ile Lys Phe Arg  Pro Gly Ser
    1085                1090                1095

Val Val  Val Gln Leu Thr Leu  Ala Phe Arg Glu Gly  Thr Ile Asn
    1100                1105                1110

Val His  Asp Val Glu Thr Gln  Phe Asn Gln Tyr Lys  Thr Glu Ala
    1115                1120                1125

Ala Ser  Arg Tyr Asn Leu Thr  Ile Ser Asp Val Ser  Val Ser Asp
    1130                1135                1140
```

```
Val Pro  Phe Pro Phe Ser Ala  Gln Ser Gly Ala Gly  Val Pro Gly
    1145                 1150                 1155

Trp Gly  Ile Ala Leu Leu Val  Leu Val Cys Val Leu  Val Ala Leu
    1160                 1165                 1170

Ala Ile  Val Tyr Leu Ile Ala  Leu Ala Val Cys Gln  Cys Arg Arg
    1175                 1180                 1185

Lys Asn  Tyr Gly Gln Leu Asp  Ile Phe Pro Ala Arg  Asp Thr Tyr
    1190                 1195                 1200

His Pro  Met Ser Glu Tyr Pro  Thr Tyr His Thr His  Gly Arg Tyr
    1205                 1210                 1215

Val Pro  Pro Ser Ser Thr Asp  Arg Ser Pro Tyr Glu  Lys Val Ser
    1220                 1225                 1230

Ala Gly  Asn Gly Gly Ser Ser  Leu Ser Tyr Thr Asn  Pro Ala Val
    1235                 1240                 1245

Ala Ala  Ala Ser Ala Asn Leu
    1250                 1255
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<210> 11
<211> 302
<212> PRT
<213> Homo sapiens

<400> 11

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Ala Ala Ala Lys Glu Gly Lys Lys Ser Arg Asp Arg Glu Arg Pro Pro
1               5                  10                  15

Ser Val Pro Ala Leu Arg Glu Gln Pro Pro Glu Thr Glu Pro Gln Pro
            20                  25                  30

Ala Trp Lys Met Pro Arg Ser Cys Cys Ser Arg Ser Gly Ala Leu Leu
        35                  40                  45

Leu Ala Leu Leu Leu Gln Ala Ser Met Glu Val Arg Gly Trp Cys Leu
    50                  55                  60

Glu Ser Ser Gln Cys Gln Asp Leu Thr Thr Glu Ser Asn Leu Leu Glu
65                  70                  75                  80

Cys Ile Arg Ala Cys Lys Pro Asp Leu Ser Ala Glu Thr Pro Met Phe
                85                  90                  95

Pro Gly Asn Gly Asp Glu Gln Pro Leu Thr Glu Asn Pro Arg Lys Tyr
            100                 105                 110

Val Met Gly His Phe Arg Trp Asp Arg Phe Gly Arg Arg Asn Ser Ser
        115                 120                 125

Ser Ser Gly Ser Ser Gly Ala Gly Gln Lys Arg Glu Asp Val Ser Ala
    130                 135                 140

Gly Glu Asp Cys Gly Pro Leu Pro Glu Gly Gly Pro Glu Pro Arg Ser
145                 150                 155                 160
```

```
Asp Gly Ala Lys Pro Gly Pro Arg Glu Gly Lys Arg Ser Tyr Ser Met
                165                 170                 175

Glu His Phe Arg Trp Gly Lys Pro Val Gly Lys Lys Arg Arg Pro Val
            180                 185                 190

Lys Val Tyr Pro Asn Gly Ala Glu Asp Glu Ser Ala Glu Ala Phe Pro
        195                 200                 205

Leu Glu Phe Lys Arg Glu Leu Thr Gly Gln Arg Leu Arg Glu Gly Asp
    210                 215                 220

Gly Pro Asp Gly Pro Ala Asp Asp Gly Ala Gly Ala Gln Ala Asp Leu
225                 230                 235                 240

Glu His Ser Leu Leu Val Ala Ala Glu Lys Lys Asp Glu Gly Pro Tyr
                245                 250                 255

Arg Met Glu His Phe Arg Trp Gly Ser Pro Pro Lys Asp Lys Arg Tyr
            260                 265                 270

Gly Gly Phe Met Thr Ser Glu Lys Ser Gln Thr Pro Leu Val Thr Leu
        275                 280                 285

Phe Lys Asn Ala Ile Ile Lys Asn Ala Tyr Lys Lys Gly Glu
    290                 295                 300
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<210> 12
<211> 31
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Peptide

<400> 12

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His His His His His His Ser Ser Ser Ser Gly Ser Ser Ser Ser Gly
1               5                   10                  15

Ser Ser Ser Ser Gly Gly Arg Gly Asp Ser Gly Arg Gly Asp Ser
            20                  25                  30
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<210> 13
<211> 19
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Peptide

<400> 13

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His His His His His His Arg Gly Glu Phe Thr Gly Thr Tyr Ile Thr
1               5                   10                  15
```

Ala Val Thr

<210> 14
<211> 12
<212> PRT
<213> Homo sapiens

<400> 14

Thr Phe Ile Ala Ile Lys Pro Asp Gly Val Gln Arg
1 5 10

<210> 15
<211> 18
<212> PRT
<213> Homo sapiens

<220>
<221> misc_feature
<222> (3)..(3)
<223> Xaa can be any naturally occurring amino acid

<400> 15

Val Met Xaa Leu Gly Glu Thr Asn Pro Ala Asp Ser Lys Pro Gly Thr
1 5 10 15

Ile Arg

<210> 16
<211> 17
<212> PRT
<213> Homo sapiens

<400> 16

Val Met Leu Gly Glu Thr Asn Pro Ala Asp Ser Lys Pro Gly Thr Ile
1 5 10 15

Arg

<210> 17
<211> 10
<212> PRT
<213> Homo sapiens

<400> 17

Asn Ile Ile His Gly Ser Asp Ser Val Lys
1 5 10

<210> 18
<211> 9
<212> PRT
<213> Homo sapiens

<400> 18

Gly Leu Val Gly Glu Ile Ile Lys Arg
1 5

<210> 19
<211> 8
<212> PRT
<213> Homo sapiens

<400> 19

Gly Leu Val Gly Glu Ile Ile Lys
1 5

<210> 20
<211> 21
<212> PRT
<213> Homo sapiens

<220>
<221> misc_feature
<222> (3)..(3)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (12)..(12)
<223> Xaa can be any naturally occurring amino acid

<400> 20

Tyr Met Xaa His Ser Gly Pro Val Val Ala Met Xaa Val Trp Glu Gly
1 5 10 15

Leu Asn Val Val Lys
20

<210> 21
<211> 19
<212> PRT
<213> Homo sapiens

<400> 21

Ala Ala Phe Asp Asp Ala Ile Ala Glu Leu Asp Thr Leu Ser Glu Glu
1 5 10 15

Ser Tyr Lys

<210> 22
<211> 18
<212> PRT
<213> Homo sapiens

<220>
<221> misc_feature
<222> (8)..(8)
<223> Xaa can be any naturally occurring amino acid

<400> 22

Ala Ala Ser Asp Ile Ala Met Xaa Thr Glu Leu Pro Pro Thr His Pro
1 5 10 15

Ile Arg

<210> 23
<211> 11
<212> PRT
<213> Homo sapiens

<400> 23

Tyr Leu Ala Glu Phe Ala Thr Gly Asn Asp Arg
1 5 10

<210> 24
<211> 10
<212> PRT
<213> Homo sapiens

<400> 24

Asp Ser Thr Leu Ile Met Gln Leu Leu Arg
1 5 10

<210> 25
<211> 9
<212> PRT
<213> Homo sapiens

<400> 25

Tyr Asp Glu Met Val Glu Ser Met Lys
1 5

<210> 26
<211> 14
<212> PRT
<213> Homo sapiens

<220>
<221> misc_feature

<222> (5)..(5)
<223> Xaa can be any naturally occurring amino acid

<400> 26

Val Ala Gly Met Xaa Asp Val Glu Leu Thr Val Glu Glu Arg
1 5 10

<210> 27
<211> 12
<212> PRT
<213> Homo sapiens

<400> 27

His Leu Ile Pro Ala Ala Asn Thr Gly Glu Ser Lys
1 5 10

<210> 28
<211> 19
<212> PRT
<213> Homo sapiens

<220>
<221> misc_feature
<222> (12)..(12)
<223> Xaa can be any naturally occurring amino acid

<400> 28

Asp Pro Asp Ala Gln Pro Gly Gly Glu Leu Met Xaa Leu Gly Gly Thr
1 5 10 15

Asp Ser Lys

<210> 29
<211> 18
<212> PRT
<213> Homo sapiens

<400> 29

Asp Pro Asp Ala Gln Pro Gly Gly Glu Leu Met Leu Gly Gly Thr Asp
1 5 10 15

Ser Lys

<210> 30
<211> 18
<212> PRT
<213> Homo sapiens

<220>
<221> misc_feature
<222> (15)..(15)

<223> Xaa can be any naturally occurring amino acid

<400> 30

Ile Ser Val Asn Asn Val Leu Pro Val Phe Asp Asn Leu Met Xaa Gln
1 5 10 15

Gln Lys

<210> 31
<211> 17
<212> PRT
<213> Homo sapiens

<400> 31

Ile Ser Val Asn Asn Val Leu Pro Val Phe Asp Asn Leu Met Gln Gln
1 5 10 15

Lys

<210> 32
<211> 10
<212> PRT
<213> Homo sapiens

<400> 32

Gln Pro Gly Ile Thr Phe Ile Ala Ala Lys
1 5 10

<210> 33
<211> 16
<212> PRT
<213> Homo sapiens

<400> 33

Gly Leu Gly Thr Asp Glu Glu Ser Ile Leu Thr Leu Leu Thr Ser Arg
1 5 10 15

<210> 34
<211> 13
<212> PRT
<213> Homo sapiens

<400> 34

Asp Leu Leu Asp Asp Leu Lys Ser Glu Leu Thr Gly Lys
1 5 10

<210> 35
<211> 9
<212> PRT

<213> Homo sapiens

<400> 35

Ser Glu Ile Asp Leu Phe Asn Ile Arg
1 5

<210> 36
<211> 45
<212> PRT
<213> Homo sapiens

<400> 36

Gly Thr Ile Asn Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys
1 5 10 15

Thr Glu Ala Ala Ser Arg Tyr Asn Leu Thr Ile Ser Asp Val Ser Val
20 25 30

Ser Asp Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala
35 40 45

<210> 37
<211> 146
<212> PRT
<213> Homo sapiens

<400> 37

Gly Thr Ile Asn Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys
1 5 10 15

Thr Glu Ala Ala Ser Arg Tyr Asn Leu Thr Ile Ser Asp Val Ser Val
20 25 30

Ser Asp Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala Gly Val Pro
35 40 45

Gly Trp Gly Ile Ala Leu Leu Val Leu Val Cys Val Leu Val Ala Leu
50 55 60

Ala Ile Val Tyr Leu Ile Ala Leu Ala Val Cys Gln Cys Arg Arg Lys
65 70 75 80

Asn Tyr Gly Gln Leu Asp Ile Phe Pro Ala Arg Asp Thr Tyr His Pro
85 90 95

Met Ser Glu Tyr Pro Thr Tyr His Thr His Gly Arg Tyr Val Pro Pro
100 105 110

Ser Ser Thr Asp Arg Ser Pro Tyr Glu Lys Val Ser Ala Gly Asn Gly
115 120 125

Gly Ser Ser Leu Ser Tyr Thr Asn Pro Ala Val Ala Ala Ala Ser Ala
130 135 140

Asn Leu
145

<210> 38
<211> 171
<212> PRT
<213> Homo sapiens

<400> 38

Gly Phe Leu Gly Leu Ser Asn Ile Lys Phe Arg Pro Gly Ser Val Val
1 5 10 15

Val Gln Leu Thr Leu Ala Phe Arg Glu Gly Thr Ile Asn Val His Asp
20 25 30

Val Glu Thr Gln Phe Asn Gln Tyr Lys Thr Glu Ala Ala Ser Arg Tyr
35 40 45

Asn Leu Thr Ile Ser Asp Val Ser Val Ser Asp Val Pro Phe Pro Phe
50 55 60

Ser Ala Gln Ser Gly Ala Gly Val Pro Gly Trp Gly Ile Ala Leu Leu
65 70 75 80

Val Leu Val Cys Val Leu Val Ala Leu Ala Ile Val Tyr Leu Ile Ala
85 90 95

Leu Ala Val Cys Gln Cys Arg Arg Lys Asn Tyr Gly Gln Leu Asp Ile
100 105 110

Phe Pro Ala Arg Asp Thr Tyr His Pro Met Ser Glu Tyr Pro Thr Tyr
115 120 125

His Thr His Gly Arg Tyr Val Pro Pro Ser Ser Thr *Asp Arg Ser Pro*
130 135 140

Tyr Glu Lys Val Ser Ala Gly Asn Gly Gly Ser Ser Leu Ser Tyr Thr
145 150 155 160

Asn Pro Ala Val Ala Ala Ala Ser Ala Asn Leu
165 170

<210> 39
<211> 275
<212> PRT
<213> Homo sapiens

<400> 39

Ala Thr Thr Thr Pro Ala Ser Lys Ser Thr Pro Phe Ser Ile Pro Ser
1 5 10 15

His His Ser Asp Thr Pro Thr Thr Leu Ala Ser His Ser Thr Lys Thr
20 25 30

Asp Ala Ser Ser Thr His His Ser Thr Val Pro Pro Leu Thr Ser Ser
35 40 45

Asn His Ser Thr Ser Pro Gln Leu Ser Thr Gly Val Ser Phe Phe Phe
50 55 60

```
Leu Ser Phe His Ile Ser Asn Leu Gln Phe Asn Ser Ser Leu Glu Asp
65                  70                  75                  80

Pro Ser Thr Asp Tyr Tyr Gln Glu Leu Gln Arg Asp Ile Ser Glu Met
                85                  90                  95

Phe Leu Gln Ile Tyr Lys Gln Gly Gly Phe Leu Gly Leu Ser Asn Ile
            100                 105                 110

Lys Phe Arg Pro Gly Ser Val Val Val Gln Leu Thr Leu Ala Phe Arg
        115                 120                 125

Glu Gly Thr Ile Asn Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr
    130                 135                 140

Lys Thr Glu Ala Ala Ser Arg Tyr Asn Leu Thr Ile Ser Asp Val Ser
145                 150                 155                 160

Val Ser Asp Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala Gly Val
                165                 170                 175

Pro Gly Trp Gly Ile Ala Leu Leu Val Leu Val Cys Val Leu Val Ala
            180                 185                 190

Leu Ala Ile Val Tyr Leu Ile Ala Leu Ala Val Cys Gln Cys Arg Arg
        195                 200                 205

Lys Asn Tyr Gly Gln Leu Asp Ile Phe Pro Ala Arg Asp Thr Tyr His
    210                 215                 220

Pro Met Ser Glu Tyr Pro Thr Tyr His Thr His Gly Arg Tyr Val Pro
225                 230                 235                 240

Pro Ser Ser Thr Asp Arg Ser Pro Tyr Glu Lys Val Ser Ala Gly Asn
                245                 250                 255

Gly Gly Ser Ser Leu Ser Tyr Thr Asn Pro Ala Val Ala Ala Ala Ser
            260                 265                 270

Ala Asn Leu
        275


<210>  40
<211>  233
<212>  PRT
<213>  Homo sapiens

<400>  40

Gly Ser Gly His Ala Ser Ser Thr Pro Gly Gly Glu Lys Glu Thr Ser
1               5                   10                  15

Ala Thr Gln Arg Ser Ser Val Pro Ser Ser Thr Glu Lys Asn Ala Phe
            20                  25                  30

Asn Ser Ser Leu Glu Asp Pro Ser Thr Asp Tyr Tyr Gln Glu Leu Gln
        35                  40                  45
```

```
Arg Asp Ile Ser Glu Met Phe Leu Gln Ile Tyr Lys Gln Gly Gly Phe
    50                  55                  60

Leu Gly Leu Ser Asn Ile Lys Phe Arg Pro Gly Ser Val Val Val Gln
65                  70                  75                  80

Leu Thr Leu Ala Phe Arg Glu Gly Thr Ile Asn Val His Asp Met Glu
                85                  90                  95

Thr Gln Phe Asn Gln Tyr Lys Thr Glu Ala Ala Ser Arg Tyr Asn Leu
            100                 105                 110

Thr Ile Ser Asp Val Ser Val Ser Asp Val Pro Phe Pro Phe Ser Ala
        115                 120                 125

Gln Ser Gly Ala Gly Val Pro Gly Trp Gly Ile Ala Leu Leu Val Leu
    130                 135                 140

Val Cys Val Leu Val Ala Leu Ala Ile Val Tyr Leu Ile Ala Leu Ala
145                 150                 155                 160

Val Cys Gln Cys Arg Arg Lys Asn Tyr Gly Gln Leu Asp Ile Phe Pro
                165                 170                 175

Ala Arg Asp Thr Tyr His Pro Met Ser Glu Tyr Pro Thr Tyr His Thr
            180                 185                 190

His Gly Arg Tyr Val Pro Pro Ser Ser Thr Asp Arg Ser Pro Tyr Glu
        195                 200                 205

Lys Val Ser Ala Gly Asn Gly Gly Ser Ser Leu Ser Tyr Thr Asn Pro
    210                 215                 220

Ala Val Ala Ala Thr Ser Ala Asn Leu
225                 230
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<210> 41
<211> 863
<212> PRT
<213> Homo sapiens

<400> 41

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Leu Asp Pro Arg Val Arg Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
1               5                   10                  15

Gly Ser Thr Ala Pro Gln Ala His Gly Val Thr Ser Ala Pro Asp Thr
            20                  25                  30

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
        35                  40                  45

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
    50                  55                  60

Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
65                  70                  75                  80

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
                85                  90                  95
```

```
Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
            100                 105                 110

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
        115                 120                 125

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
    130                 135                 140

Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
145                 150                 155                 160

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
                165                 170                 175

Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
            180                 185                 190

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
        195                 200                 205

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
    210                 215                 220

Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
225                 230                 235                 240

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
                245                 250                 255

Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
            260                 265                 270

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
        275                 280                 285

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
    290                 295                 300

Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
305                 310                 315                 320

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
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Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
            340                 345                 350

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
        355                 360                 365

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
    370                 375                 380

Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
385                 390                 395                 400

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
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Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
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Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
435 440 445

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
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Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala
465 470 475 480

Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr Arg Pro Ala Pro
485 490 495

Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser Ala Pro Asp Thr
500 505 510

Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His Gly Val Thr Ser
515 520 525

Ala Pro Asp Thr Arg Pro Ala Pro Gly Ser Thr Ala Pro Pro Ala His
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Gly Val Thr Ser Ala Pro Asp Asn Arg Pro Ala Leu Gly Ser Thr Ala
545 550 555 560

Pro Pro Val His Asn Val Thr Ser Ala Ser Gly Ser Ala Ser Gly Ser
565 570 575

Ala Ser Thr Leu Val His Asn Gly Thr Ser Ala Arg Ala Thr Thr Thr
580 585 590

Pro Ala Ser Lys Ser Thr Pro Phe Ser Ile Pro Ser His His Ser Asp
595 600 605

Thr Pro Thr Thr Leu Ala Ser His Ser Thr Lys Thr Asp Ala Ser Ser
610 615 620

Thr His His Ser Ser Val Pro Pro Leu Thr Ser Ser Asn His Ser Thr
625 630 635 640

Ser Pro Gln Leu Ser Thr Gly Val Ser Phe Phe Phe Leu Ser Phe His
645 650 655

Ile Ser Asn Leu Gln Phe Asn Ser Ser Leu Glu Asp Pro Ser Thr Asp
660 665 670

Tyr Tyr Gln Glu Leu Gln Arg Asp Ile Ser Glu Met Phe Leu Gln Ile
675 680 685

Tyr Lys Gln Gly Gly Phe Leu Gly Leu Ser Asn Ile Lys Phe Arg Pro
690 695 700

Gly Ser Val Val Val Gln Leu Thr Leu Ala Phe Arg Glu Gly Thr Ile
705 710 715 720

Asn Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys Thr Glu Ala
725 730 735

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Ala Ser Arg Tyr Asn Leu Thr Ile Ser Asp Val Ser Val Ser Asp Val
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Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala Gly Val Pro Gly Trp Gly
        755                 760                 765

Ile Ala Leu Leu Val Leu Val Cys Val Leu Val Ala Leu Ala Ile Val
    770                 775                 780

Tyr Leu Ile Ala Leu Ala Val Cys Gln Cys Arg Arg Lys Asn Tyr Gly
785                 790                 795                 800

Gln Leu Asp Ile Phe Pro Ala Arg Asp Thr Tyr His Pro Met Ser Glu
                805                 810                 815

Tyr Pro Thr Tyr His Thr His Gly Arg Tyr Val Pro Pro Ser Ser Thr
            820                 825                 830

Asp Arg Ser Pro Tyr Glu Lys Val Ser Ala Gly Asn Gly Gly Ser Ser
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Leu Ser Tyr Thr Asn Pro Ala Val Ala Ala Ala Ser Ala Asn Leu
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ccagcagtgg cagccgcttc tgccaacttg tagggcacgt cgccgctgag ctgagtggcc 480

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<211> 820

<212> DNA
<213> Homo sapiens

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<211> 1132
<212> DNA
<213> Homo sapiens

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<211> 717
<212> DNA
<213> Homo sapiens

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caattgactc tggccttccg agaaggtacc atcaatgtcc acgacgtgga gacacagttc 300

aatcagtata aaacggaagc agcctctcga tataacctga cgatctcaga cgtcagcgtg 360

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agcagtaccg atcgtagccc ctatgagaag gtttctgcag gtaatggtgg cagcagcctc 660

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<210> 46
<211> 2487
<212> DNA
<213> Homo sapiens

<400> 46
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<210> 47
<211> 19
<212> PRT
<213> Homo sapiens

<400> 47

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Val Leu Thr

<210> 48
<211> 4003
<212> DNA
<213> Homo sapiens

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<223> PCR Primer

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<210> 50
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<223> PCR Primer

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<210> 56
<211> 39
<212> DNA
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<223> PCR Primer

<400> 56
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<210> 57
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<212> DNA
<213> Artificial Sequence

<220>

<223> PCR Primer

<400> 57
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<210> 58
<211> 23
<212> PRT
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<400> 58

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Val Leu Thr Val Val Thr Ala
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<210> 59
<211> 24
<212> PRT

<213> Homo sapiens

<400> 59

Met Thr Pro Gly Thr Gln Ser Pro Phe Phe Leu Leu Leu Leu Leu Thr
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Val Leu Thr Val Val Thr Ala Gly
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<210> 60
<211> 50
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<220>

<223> Synthetic Peptide

<400> 60

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Glu Ala Ala Ser Pro Tyr Asn Leu Thr Ile Ser Asp Val Ser Val Ser
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Asp Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala His His His His
35 40 45

His His
50

<210> 61
<211> 63
<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Peptide

<400> 61

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1 5 10 15

Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys Thr Glu Ala Ala
20 25 30

Ser Pro Tyr Asn Leu Thr Ile Ser Asp Val Ser Val Ser Asp Val Pro
35 40 45

Phe Pro Phe Ser Ala Gln Ser Gly Ala His His His His His His
50 55 60

<210> 62
<211> 19

<212> PRT
<213> Artificial Sequence

<220>

<223> Synthetic Peptide

<400> 62

His His His His His His Ser Val Val Val Gln Leu Thr Leu Ala Phe
1 5 10 15

Arg Glu Gly

<210> 63
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Glu Ala Ala Ser Arg Tyr Asn Leu Thr Ile Ser Asp Val Ser Val Ser
20 25 30

Asp Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala
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Glu Ala Ala Ser Pro Tyr Asn Leu Thr Ile Ser Asp Val Ser Val Ser
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Asp Val Pro Phe Pro Phe Ser Ala Gln Ser Gly Ala
35 40

<210> 65
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Ser Val Val Val Gln Leu Thr Leu Ala Phe Arg Glu Gly
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<400> 66

Ser Val Val Val Gln Leu Thr Leu Ala Phe Arg Glu Gly Thr Ile Asn
1 5 10 15

Val His Asp Val Glu Thr Gln Phe Asn Gln Tyr Lys Thr Glu Ala Ala
20 25 30

Ser Pro Tyr Asn Leu Thr Ile Ser Asp Val Ser Val Ser Asp Val Pro
35 40 45

Phe Pro Phe Ser Ala Gln Ser Gly Ala
50 55